

patient and after transmission through the patient (col. 17, lines 35-43, col. 18 lines 12-19) and is computed using tomographic reconstruction methods, not a dose algorithm (col. 18 lines 52-68, specifically line 54 and lines 64-68). The absorption image apparently serves as a means of verification (col. 19, lines 1-3), although it remains unclear as to how exactly that is done.

The process in our above Claim 7 is for an entirely different type of radiation machine and geometry, notwithstanding the merits of the tomotherapy machine described by Swerdloff. In a gantry mounted machine, the radiation source is mounted at the end of a long gantry, so that the radiation source can also be rotated around a patient. But the radiation beam is generally collimated to include the entire volume along the long axis of the patient's body and the patient is normally irradiated without translation along the axis of rotation. Thus thin abutting slices are not normally treated and it would be difficult if not impossible to do so with a gantry mounted machine.

In our process in claim 7 dose to the patient is verified by recomputing the dose to the patient using a dose algorithm and using each measured field to describe the field fluence directed toward the patient for each beam as an input to the dose algorithm for each beam. Whereas the field fluence is simulated by a treatment planning system, here the field fluence is measured instead. Otherwise the dose calculation process is the same or similar to that in a planning system. The resulting dose distribution is a simple sum of the dose from all the beams as is typically done in planning systems.

In our Claim 7 the beam is measured over the area of the beam in a plane perpendicular to the central ray (see our figures 1 and 2), and not along a circular arc as depicted in figure 2, figure 5 (parts 47 and 53) and figure 14 (parts 49 and 54) of Swerdloff. Nor is a measurement made for each corresponding ray after it transverses the patient as is done in Swerdloff (col. 14, lines 10-21). In claim 7 the dose is computed from a dose algorithm, not derived from an absorption image that is derived from both entrance and exit measurements.

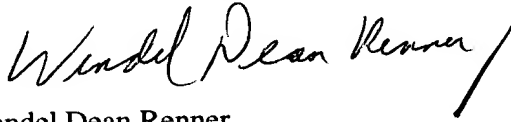
In regard to item (6) of the Office Action of 10/7/2002, Swerdloff (col. 2, lines 31-34) clearly refers to control and verification of a radiation intensity compensator that is activated during the radiation process, and to the collection of tomographic data for generation of tomographic absorption images. The production of these images requires the tomographic geometry of the machine depicted in figure 5 of Swerdloff and on a pre-patient monitor and a post-patient monitor for each ray, figure 14. Col. 5 lines 6-8 clearly referred to the conical geometry of the tomotherapy machine and the absorbers used to control rays in a fan beam geometry. This machine is entirely different from gantry mounted medical linear accelerators which do not use fan beam geometry. Col. 7 lines 43-55 refer to controlling the dose by controlling the compensators that can block each ray for part of the irradiation beam. Col. 9 lines 29-61 refer to the treatment planning stage of tomotherapy, not verification (col. 8 line 68 - col. 9, line 2). Col. 14, lines 39-49 refer to the mathematical procedure of designing the treatment, not to verification of the treatment. In particular these lines deal with the mathematical operations necessary to produce the profile of dose that is to be delivered at each gantry angle. Further in col. 18

lines 62-68, the tomographic absorption image is constructed in a manner similar to tomographic x-ray imaging, not a dose algorithm. It is not explained how one obtains dose from an absorption image.

### **Conclusion**

For all of the above reasons, applicant submits that the claim is now in proper form, and that the claim defines patentably over the prior art. Therefore he submits that this application is now in condition for allowance, which action is respectfully solicited.

Respectfully submitted:



Wendel Dean Renner  
5975 Gales Lane  
Columbia, Maryland 21045

Date: Oct 25, 2002

410 997-9578 or 410 997-4168  
fax 410 997-9578  
WendelDRenner@comcast.net